

REMARKS

This Amendment is in response to the Office Action of February 11, 2004, in which the Examiner rejected claims 1-33 and 36-39 over Grimes '551 in view of Elton '565 and Takaoka '703 for the reasons set forth in the prior Office Action mailed August 13, 2001.

The Examiner asserts that Grimes discloses a transformer with windings, cooling ducts, and duct stick. Grimes does not disclose the specific cable use for the windings. However, the Examiner asserts that Elton discloses electrical cables configured for use with an electrical device and Takaoka allegedly discloses a high voltage cable having a specific size range diameter.

The Examiner's rejection of the claims is respectfully traversed for reasons set forth below.

With respect to Grimes, the reference shows an induction winding formed of an insulated conductor wound around a core in a plurality of layers and a plurality of duct spacers between the respective layers to define fluid receiving cooling ducts. The reference requires spaces between each of the layers in order to effect cooling, whereas the present invention requires no such arrangement. This is because a conventional device such as Grimes operates at high current that results in high thermal losses, whereas the present invention operates at high voltage and hence has low thermal losses.

The Examiner states that the rejection is based on using the cable of Elton for the conductor disclosed in Grimes to reduce corona discharge. It is submitted that every transformer is designed with an insulation system to reduce corona discharge. However, conventional transformers have windings, that operate at a high potential with respect to ground. Thus, there is a limit at which such transformers may operate. In the present invention, however, the insulation system employs two semi-conductor layers. The inner semi-conductor layer is in contact with the central conductor and forms an equipotential surface. Likewise, the outer semi-conducting layer forms an equipotential surface. Accordingly, the potential at the outer surface of the insulated conductor is at or near ground. In Grimes, this is not the case.

The Examiner suggests that it would be obvious to combine cable of Elton for the conductor in Grimes. However, nowhere in Elton is there any suggestion that the conductor can be used as a winding in a transformer.

During a telephone conference conducted with the Examiner, sometime after the mailing of the Office Action, the Examiner noted that the rejection of the claims in the related

case was affirmed by the Board of Appeals. However, that case involved a rotating electric machine in which the cable of Elton et al. was asserted to form the winding of the machine. Applicants do not agree with the Board's decision, because they do not believe that the combination of a rotating machine and a cable are disclosed or suggested. More importantly, in the present situation, there is no suggestion that the cable of Elton would be useful in anything other than a rotating machine.

With respect to the Examiner's comments regarding the complex shapes in Elton, it is submitted that it would be impossible to make a cable as described in Elton that would be sufficiently flexible to form a winding in a transformer; and if the conductor was formed in the manner suggested by Elton, it would be impossible to make the winding work.

The claims have been amended in order to set forth a transformer having at least one winding comprising a flexible cable having a current-carrying conductor with a plurality of insulated strands and at least one uninsulated strand. The conductor is surrounded by an insulation system, including a first layer having semiconducting properties being in contact with the conductor, a solid insulation surrounding the inner layer and a second layer having semiconducting properties. The arrangement is not shown or suggested in any of the other references cited by the Examiner.

Elton discloses a transmission line cable, and makes no reference whatsoever to the possibility using such a cable in a transformer. Grimes simply shows a conventional transformer fabricated from a strip conductor. The space between each layer of the strip conductor has spaces for forming cooling air ducts. Given that the type of conductor in Grimes is entirely different from a cable, there would be no motivation to substitute the cable of Elton in the transformer of Grimes.

Finally, Takaoka is likewise a power transmission cable and its construction and design are tailored for overcoming problems associated with the transmission of high voltage, namely the elimination of the so-called "skin effect". The arrangement of the present invention is designed for use in a static machine to reduce eddy currents between the conductors and thereby reduce thermal losses.

The conductor in Takaoka do not cooperate with the insulation to achieve the desired result. Whereas the uninsulated strands in the conductor contact the inner layer having semiconducting properties to establish an equipotential surface; and the insulated strands eliminate eddy currents.

During a telephone conference conducted on March 15, 2004, the Examiner requested a Terminal Disclaimer. However, the Examiner did not identify a granted patent or pending application to which the subject matter of the present invention pertains. The present application is directed to a high power transformer employing a cable winding. The technology has been identified by the applicants' assignee under the code ENKEL. The ENKEL technology relates to rotating electric machines, e.g. motors and generators; and static electric machines e.g. transformers and reactors. The present application is the first in a series of transformer applications actually filed November 28, 1997. The first in a series of cases relating to rotating electric machines was likewise actually filed on November 28, 1997. Some of the ENKEL applications bear a different filing date, but that is because the filing date for Section 371 applications is delayed pending receipt of formal documents. However, it is believed that for purposes of measuring the expiration date of a patent, the actual date the application is filed in the United States Patent and Trademark Office is the date from which the twenty year patent term is measured. Accordingly, it is not seen how a Terminal Disclaimer will effect any change in the expiration date of a patent granted on the present application relative to any of the related ENKEL applications. Accordingly, it is respectfully requested that the Examiner withdraw the requirement.

In view of the foregoing, it is respectfully requested that the Examiner reconsider his rejection of the claims, the allowance in which is earnestly solicited.

The Commissioner is authorized to charge Deposit Account No. 04-2223 for fees, which may be required in this matter or credit any overpayment thereto.

Respectfully submitted

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